

REMARKS

The Office Action dated March 1, 2004 has been received and carefully noted. The above amendments to the Abstract, specification, and claims, and the following remarks, are submitted as a full and complete response thereto.

A new Abstract is submitted to be in compliance with United States patent practice. The specification has been amended to correct minor typographical errors contained therein. Claim 2 has been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Claims 1-7 are respectfully submitted for consideration.

The Abstract of the Disclosure was objected to as being too long. A new Abstract is submitted, which is in compliance with United States patent practice.

Claim 2 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants respectfully submit that the claim has been amended to more particularly point out and distinctly claim the subject matter of the invention. Applicants note that the term “are greater in number” has been replaced by “is smaller.” Applicants submit that this was merely a transcription error which appeared in claim 2 and on page 2 of the specification. Full support for this corrective amendment can be found in the specification as originally filed, for example, page 9, lines 19-25, and also as illustrated in Figure 8. In the specification it is discussed that the illustrated insulator assembly is adapted for coil blocks having six axial sections on the out layer, and five axial sections

on the inner layer; this is tantamount to a number of axial sections disposed in the inner cylindrical layer being smaller than a number of axial sections disposed in the outer cylindrical layer by 1. It is respectfully submitted, therefore, that this rejection of claim 2 has been overcome. This amendment was not made in view of prior art, and does not narrow the scope of the claims.

Claims 1-7 were rejected under 35 U.S.C. § 102(b) as being anticipated by Rabe. (United States Patent No. 5,331,244). As will be discussed below, applicants submit that claims 1-7 recite subject matter which is neither disclosed nor suggested in Rabe.

Claim 1, upon which claims 2-7 are dependent, is directed to an armature coil for a rotary electric machinery such as electric generators and motors. The armature coil includes a plurality of identical coil blocks each formed by a plurality of turns of an elongated conductor so as to correspond to different phases. Each of the coil blocks includes two groups of axial sections which are diametrically opposed to each other, and curved sections joining the two groups to each other at each axial end. The axial sections of one of the groups are disposed in an inner cylindrical layer while the axial sections of the other of the groups are disposed in an outer cylindrical layer which is coaxial with the inner cylindrical layer. The coil blocks are combined with each other by circumferentially shifting one coil block from another in such a manner that the axial sections are arranged circumferentially along the inner and outer layers, one next to another.

As a result of the claimed configurations of the invention, an armature coil is effectively and efficiently provided which can be used in high-speed rotary electric machinery such as electric motors as generators. As will be discussed below, Rabe fails to disclose or suggest a configuration having the elements of the present claims. Therefore, Rabe fails to provide the critical and unobvious advantages which are provided by the invention.

Rabe discloses a permanent magnet DC machine having meander-like stator windings for producing high torque, without excessive heating. The Office Action refers to winding heads 42 and 46 of Figure 3 of Rabe as being comparable to the two groups of axial sections of the coil blocks of claim 1. The Office Action further takes the position that meander section 48 is comparable to the combined coil blocks being circumferentially shifted to arrange the axial sections circumferentially along inner and outer cylindrical layers. Figure 3 of Rabe illustrates a close up of meander-like stator means 40 as illustrated in Figures 1 and 2. Two conductor means 40' and 40" form the meander means, to form an extending meander section 44, an upper winding head 42, a linear backward extending meander section 48, a lower or outer winding head 46, which then forms another extending meander section 44. Though Figure 4A, 4B and 4C illustrate various embodiments of these meander sections arranged in a circular pattern, it would appear that the fundamental configuration of the coil blocks in Rabe is considerably different from that which is claimed. Though the general shape of the meander portions may need to be curved to form a semi-circular meander-like conductor

array segment, Rabe does not disclose or suggest any coil blocks having two groups of axial sections which are diametrically opposed to each other and curved sections joining the two groups to each other at each axial end. The configuration of Rabe is essentially a plurality of linear sections in a linear, repetitive, meander-like stator. There can be, therefore, no disclosure of an inner cylindrical layer and an outer cylindrical layer as recited in the claims.

In other words, applicants respectfully submit that meander-like stator means 40 with mutually parallel conductor 40' and 40'' can not be considered to be comparable in any way to the claimed invention. Rabe fails to disclose or suggest, as noted above, coil blocks each formed by a plurality of turns of an elongated conductor so as to correspond to different phases, and including two groups of axial sections which are diametrically opposed to each other. Though the Office Action refers to winding heads 42 and 46 of Rabe as being comparable to the two groups of axial sections of each coil block recited in claim 1, these winding heads do not extend in and axial direction. On the contrary, these winding heads extend in the circumferential direction to connect the ends of linear forward and backward extending meander sections 44 and 48. These extending sections are not diametrically opposed to each other.

Furthermore, there is no disclosure nor suggestion in Rabe of disposing axial sections of one of two groups of axial sections being disposed in an inner cylindrical layer while axial sections of other of the groups are disposed in an outer cylindrical layer which is coaxial with the inner cylindrical layer. Referring to Figure 2 of Rabe, forward

and backward extending sections 44 and 48 are disposed in a same cylindrical layer or annular gap 35. It is respectfully submitted, therefore, that Rabe cannot be properly used to reject any of claims 1-7.

Claim 1 is separately rejected under 35 U.S.C. § 102(e) as being anticipated by Asao (United States Patent No. 6,501,205). As will be discussed below, claim 1 recites subject matter neither disclosed nor suggested in Asao.

Claim 1 is discussed above. Asao discloses an alternator having a rotor and a stator facing the rotor. The stator includes a stator core which faces the rotor, and a polyphase stator winding in the stator core. The Office Action takes the position that the winding configuration illustrated in Figure 22 of Asao is comparable to the claimed invention. The portion of Asao which the Office Action seems to be focusing on is the illustration of turn portions 400a of a large wire-strand group being positioned so as to surround turn portions 40a of a small wire-strand group 45. However, the turn portions 40a and 400a in conjunction with straight portions 40b and 400b seem to be disposed in a consistent, repetitive fashion. Applicants strongly but respectfully submit that it is improper to interpret Figure 22 of Asao as disclosing or suggesting a configuration wherein coil blocks are combined with each other by circumferentially shifting one coil block from another such that axial sections are arranged circumferentially, as recited in the claims. Applicants submit that Asao simply does not disclose or suggest the elements of claim 1.

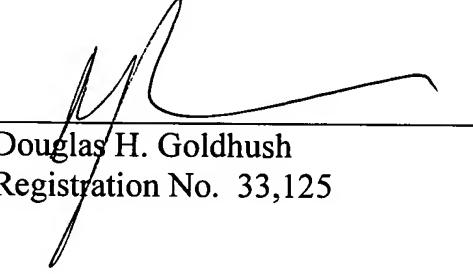
Furthermore, though an argument can be made that, in Asao, turn portions surround each other, there is no disclosure nor suggestion in Asao of a plurality of identical coil blocks each formed by a plurality of turns of an elongated conductor so as to correspond to different phases. Turn portions 40a and 400a of Asao are provided to connected straight portions 40b and 400b at their ends. Referring to Figures 18, 19, and/or 21 of Asao, the straight portions 40b and 400b connected by turn portions 40a and 400a do not form two groups which are diagonally opposed to each other. It is respectfully submitted, therefore, that Asao does not provide an appropriate basis upon which to reject claim 1.

In view of the above, applicants respectfully and strongly submit that each of claims 1-7 recite subject matter which is neither disclosed nor suggested in the cited prior art. Applicants submit that this subject matter is more than sufficient to render the claimed invention unobvious to a person of ordinary skill in the art. Applicants therefore request that claims 1-7 are be found allowable, and this application pass to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosure: Replacement Abstract



ABSTRACT

An armature coil for a rotary electric machinery includes a plurality of identical coil blocks each formed by a plurality of turns of an elongated conductor. Each of the coil blocks includes two groups of axial sections which are diametrically opposed to each other, and curved sections joining the two groups to each other at each axial end. The axial sections of one of the groups are disposed in an inner cylindrical layer while the axial sections of the other of the groups are disposed in an outer cylindrical layer which is coaxial with the inner cylindrical layer. The coil blocks are combined with each other by circumferentially shifting one coil block from another in such a manner that the axial sections are arranged circumferentially along the inner and outer cylindrical layers, one next to another.